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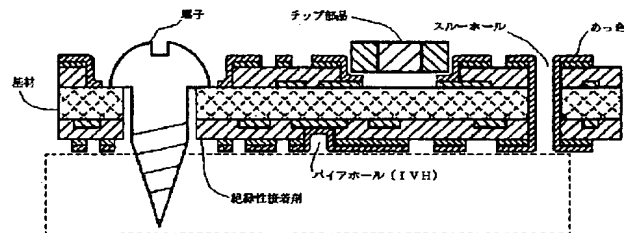
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(54) 【発明の名称】 配線板及びその製造法

(57) 【要約】

【課題】薄型化に優れた配線板と、そのような配線板を簡便に、より効率良く製造する方法を提供すること。

【解決手段】複数の絶縁層と、複数の配線層と、少なくとも隣接する配線層の接続を行うバイアホールを有する多層配線板において、チップ部品あるいは基板固定用螺子の搭載部分に、凹部を有すること。



【特許請求の範囲】

【請求項1】複数の絶縁層と、複数の配線層と、少なくとも隣接する配線層の接続を行うバイアホールを有する多層配線板において、チップ部品あるいは基板固定用螺子の搭載部分に、凹部を有することを特徴とする配線板。

【請求項2】凹部が、最外層の配線層とそれを支持する絶縁層を除去したものであることを特徴とする請求項1に記載の配線板。

【請求項3】凹部に露出した内層回路と、最外層の回路が、めっきによって接続されていることを特徴とする請求項1または2に記載の配線板。

【請求項4】銅箔に絶縁性接着剤を塗布した銅箔付絶縁性接着層の、凹部を形成する箇所に予め穴をあけ、その穴をあけた銅箔付絶縁性接着層の接着剤面を内層回路側に接触するように重ね、加熱加圧して積層一体化し、その積層一体化した積層板全面に、無電解めっきもしくは無電解めっき及び電解めっきを行い、不要な箇所の銅箔を選択的にエッチング除去することを特徴とする配線板の製造法。

【請求項5】絶縁性接着剤が、高分子エポキシ重合体であることを特徴とする請求項4に記載の配線板の製造法。

【請求項6】銅箔に絶縁性接着剤を塗布した銅箔付絶縁性接着層の接着剤面を内層回路側に接触するように重ね、加熱加圧して積層一体化し、その積層一体化した積層板の凹部を形成する箇所の銅箔を選択的にエッチング除去した後、銅箔をエッチング除去した箇所に、露出した絶縁性接着層を選択的にエッチング除去し、さらに全面に無電解めっきを行い、不要な箇所の銅箔を選択的にエッチング除去することを特徴とする請求項1、2または3に記載の配線板の製造法。

【発明の詳細な説明】**【0001】**

【発明の属する技術分野】本発明は、配線板とその製造法に関する。

【0002】

【従来の技術】近年、多層配線板の高密度化、薄型化が進展し、ガラスクロスを使用しない多層配線板製造法が検討されており、隣接する配線層のみ接続を行う、いわゆるインタースティシャルバイアホール（以下、IVHという。）を形成する方法が種々検討されている。すなわち、ガラスクロスを使用しないことにより絶縁層の厚さを抑制し、隣接する配線層のみの接続により、接続層以外の回路層の配線面積が増加するものである。このようなバイアホールを有する配線板は、特開昭58-64097号公報、特開平4-148590号公報に記載され、図2に示すように、複数の絶縁層と、複数の配線層と、少なくとも隣接する配線層の接続を行うバイアホールを有する多層配線板が記載されている。

【0003】また、内層回路に絶縁性樹脂層と、その上にさらに金属層を形成し、その金属層のバイアホールを形成する箇所を選択的にエッチング除去し、その除去した箇所に露出した絶縁性樹脂層をケミカルエッチングし、穴内壁を金属化して、バイアホールを形成する方法が、特開平4-148590号公報、特開平5-259649号公報等に開示されている。このうち、特開平5-259649号公報には、絶縁性樹脂にアルカリ溶解性樹脂を用い、ケミカルエッチング液としてアルカリを用いることが記載され、特開平4-148590号公報には、絶縁性樹脂にチバ・ガイギー社製の感光性エポキシ樹脂 Probimer 52を用い、ケミカルエッチング液としてチバ・ガイギー社製の現像剤DY90（プロピレンカーボネート、シクロヘキサノン及びガンマブチラクトンの混液）を用いることが記載されている。

【0004】

【発明が解決しようとする課題】ところで、最近では、電子機器、特にビデオカメラやノートパソコン等のように、薄型化がより一層求められるようになってきており、従来の特開昭58-64097号公報に記載されているような、バイアホールを有する多層配線板では、対応できなくなっている。

【0005】本発明は、薄型化に優れた配線板と、そのような配線板を簡便に、より効率良く製造する方法を提供することを目的とする。

【0006】

【課題を解決するための手段】本発明の配線板は、複数の絶縁層と、複数の配線層と、少なくとも隣接する配線層の接続を行うバイアホールを有する多層配線板において、チップ部品あるいは基板固定用螺子の搭載部分に、凹部を有することを特徴とする。

【0007】このような配線板は、銅箔に絶縁性接着剤を塗布した銅箔付絶縁性接着層の、凹部を形成する箇所に予め穴をあけ、その穴をあけた銅箔付絶縁性接着層の接着剤面を内層回路側に接触するように重ね、加熱加圧して積層一体化し、その積層一体化した積層板全面に無電解めっきを行い、不要な箇所の銅箔を選択的にエッチング除去することによって製造することができる。

【0008】

【発明の実施の形態】また、銅箔に絶縁性接着剤を塗布した銅箔付絶縁性接着層の接着剤面を、内層回路側に接触するように重ね、加熱加圧して積層一体化し、その積層一体化した積層板の凹部を形成する箇所の絶縁性接着層を選択的にエッチング除去し、さらに全面に無電解めっきを行い、不要な箇所の銅箔を選択的にエッチング除去することによっても製造することができる。

【0009】本発明の凹部は、図1に示すように、最外層の配線層とそれを支持する絶縁層を除去して形成することができ、この凹部に露出した内層回路と、最外層の回路が、めっきによって接続することができる。

【0010】本発明に用いる銅箔に絶縁性接着剤を塗布した銅箔付絶縁性接着層は、銅箔にプリント配線板もしくは多層配線板で一般的に使用される電解銅箔、圧延銅箔、極薄銅箔、Niを中央に挟んだ3層銅箔等が使用できる。この絶縁性接着剤には、二官能エポキシ樹脂とハロゲン化二官能フェノール類の配合当量比をエポキシ基：フェノール水酸基＝1：0.9～1.1とし、触媒の存在下、加熱して重合させたフィルム形成能を有する分子量100、000以上のハロゲン化高分子量エポキシ重合体及び架橋剤、多官能エポキシ樹脂を構成成分とする熱硬化性エポキシ接着フィルムが使用できる。また、ハロゲン化高分子エポキシ重合体に替えて、ブロム化フェノキシ樹脂を使用した熱硬化性エポキシ接着樹脂絶縁層も使用可能である。

【0011】凹部を形成する箇所、すなわち穴をあけるためには、大面積もしくは複雑形状部では、歯型による打ち抜きが最適である。円形では、ドリルによる穴あけも適用できる。炭化による絶縁低下が問題にならない回路仕様もしくは炭化物の除去が後プロセスで可能であるならば、レーザ加工も可能である。

【0012】その穴をあけた銅箔付絶縁性接着層の接着剤層を内層回路側に接触するように重ね、加熱加圧して積層一体化するには、クッションプレス法が必須ではないが、絶縁性接着剤層の樹脂の流動をほぼ抑制するという点で最適である。絶縁性接着剤層の樹脂流動が、実質上無視できる特性である場合もしくは無視できる凹部設計仕様の場合には、鏡板プレス法も可能である。クッション材としては、テドラ（デュボン社製、商品名）やTPXフィルム（三井石油化学工業株式会社製、商品名）等の耐熱性離型フィルムとポリエチレン、ポリプロピレン等の熱可塑性フィルムの組み合わせが使用可能である。また、ノボン（チソ株式会社製、商品名）フィルム等の水溶性熱可塑性フィルムも使用できる。

【0013】その積層一体化した積層板全面に無電解めっきを行うには、CC-41等の厚付け無電解めっきが使用できる。また、無電解めっきと電解めっきを併用する場合には、CUST-201（日立化成工業株式会社製、商品名）等の下地無電解銅めっきもしくは無電解めっき液CC-41（日立化成工業株式会社製、商品名）等の厚付け無電解銅めっきが使用できる。電解銅めっきとしては、硫酸銅めっきやピロリン酸銅めっきが使用できる。

【0014】不要な箇所の銅箔を選択的にエッチング除去するには、プリント配線板の一般的な技術である。ドライフィルムによる露光・現像・エッチングによる銅箔のエッチング除去ができる。エッチング液には塩化第二鉄、塩化第二銅、アルカリのどれかが使用可能であり、それぞれに適したドライフィルムが使用可能である。また、NCルータによる銅箔の切削除去も可能である。

【0015】また、銅箔に絶縁性接着剤を塗布した銅箔

付絶縁性接着層の接着剤層を内層回路側に接触するように重ね、加熱加圧して積層一体化し、その積層一体化した積層板の凹部を形成する箇所の絶縁性接着層を選択的にエッチング除去するには、内層回路基板の樹脂と絶縁性接着剤層の樹脂との選択エッチング性が必要であり、濃硫酸は不敵である。前述の高分子エポキシ重合体を配合した絶縁性接着剤を用いた場合は、アミド系溶媒、アルカリ金属化合物、アルコール系溶媒よりなるエッチング液に浸漬することにより、エポキシ基板、ポリイミド基板系基板及びBT基板において選択エッチング性が得られ、絶縁樹脂層のエッチングができる。

【0016】

【実施例】

実施例1

図3(a)に示すように、銅張り積層板E-67（日立化成工業株式会社製、商品名）の両面に、エッチングレジストを形成し、エッチングレジストから露出した銅箔を、塩化第二鉄／塩酸を主体とする化学エッチング液を噴霧して、選択的にエッチング除去し、内層回路板を作成した。次に、図3(b)に示すように、厚さ18μmの銅箔に、高分子エポキシ重合体を特徴的に配合した絶縁性接着剤であるAS-3000（日立化成工業株式会社製、商品名）のワニス、をアプリケーションで塗布し、130℃、10分間の条件で乾燥し、図3(c)に示すように、半硬化状態とした銅箔付絶縁性接着層の、凹部を形成する箇所に、数値制御式ドリルマシンで穴をあけ、図3(d)に示すように、その穴をあけた銅箔付絶縁性接着層の接着剤層を、前記内層回路板の内層回路側に接触するように重ね、図3(e)に示すように、保持温度175℃、保持時間45分間、圧力2.5MPaの条件で、加熱加圧して積層一体化し、図3(f)に示すように、その積層一体化した積層板の必要な箇所にスルーホールとなる穴をあけ、図3(g)に示すように、穴をあけた積層板を、CC-41めっき液（日立化成工業株式会社製、商品名）に、70℃、18時間の条件で、浸漬し、無電解めっきを行い、図3(h)に示すように、その表面に、エッチングレジストを形成し、エッチングレジストから露出した不要な箇所の銅箔を、選択的にエッチング除去して、配線板を製造した。この配線板の凹部は、図3(h)に示すように、深さが0.05mm、幅0.5mm、長さ1.0mmのものであった。また、ビス止めする箇所は、直径1.5mmの範囲で、深さが0.10mmの凹部となった。

【0017】実施例2

実施例1と同様にして、図4(a)に示すように内層回路板を作成した。次に、図4(b)に示すように、厚さ18μmの銅箔に、絶縁性接着剤であるAS-3000（日立化成工業株式会社製、商品名）フィルムを130℃、2MPa、5分間の条件でプレスして銅箔付絶縁性接着層を得た。次に、図4(c)に示すように、この銅

箔付絶縁性接着層の接着剤面を、前記内層回路板の内層回路側に接触するように重ね、175℃、45分間、圧力2.5MPaの条件で、加熱加圧して積層一体化し、その積層一体化した積層板の必要な箇所、数値制御式

(ケミカルエッチング液の組成)

・ N-メチル-2-ピロリドン	81重量%
・ 水酸化カリウム	2.7重量%
・ メチルアルコール	6.3重量%
・ 水	10重量%

さらに、水酸化ナトリウム40g/l、過マンガン酸カリウム60g/lの溶液に、60℃で10分間浸漬し、スミア処理を行った後、CC-41めっき液(日立化成工業株式会社製、商品名)に、70℃で18時間浸漬し、全面に無電解めっきを行い、真空ロールラミネータによるラミネートに引き続き真空クッション材プレス(130℃、10分間)によりエッチングレジストを形成し、露出・現像によりレジスト像を形成し、エッチングレジストから露出した不要な箇所の銅箔を、選択的にエッチング除去して、配線板を作成した。この配線板の凹部は、図4(h)に示すように、深さが0.05mm、幅0.5mm、長さ1.0mmのものであった。また、ビス止めする箇所は、直径1.5mmの範囲で、深さが0.10mmの凹部となった。

ドリルマシンでスルーホールとなる穴をあけ、さらに積層板の凹部を形成する箇所の絶縁性接着層を以下の組成のケミカルエッチング液に60℃で30分間浸漬して、選択的にエッチング除去した。

【0018】

【発明の効果】以上に説明したように、本発明によって、薄型化に優れた配線板と、このような配線板を簡便に、かつ効率に優れた配線板の製造法を提供することができる。

【図面の簡単な説明】

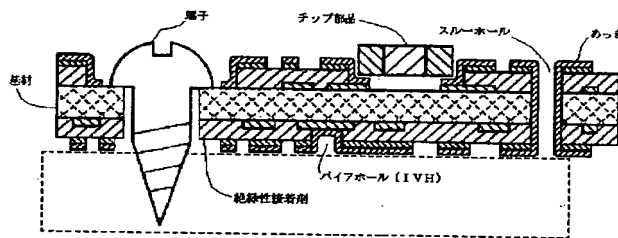
【図1】本発明の一実施例を示す断面図である。

【図2】従来のバイアホール付配線板の一実施例を示す断面図である。

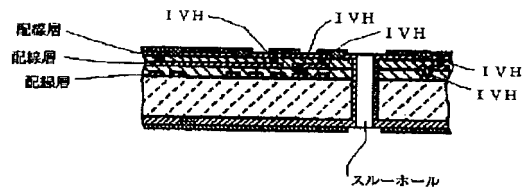
【図3】(a)～(h)は、それぞれ本発明の一実施例を説明するための各工程における断面図である。

【図4】(a)～(h)は、それぞれ本発明の他の実施例を説明するための各工程における断面図である。

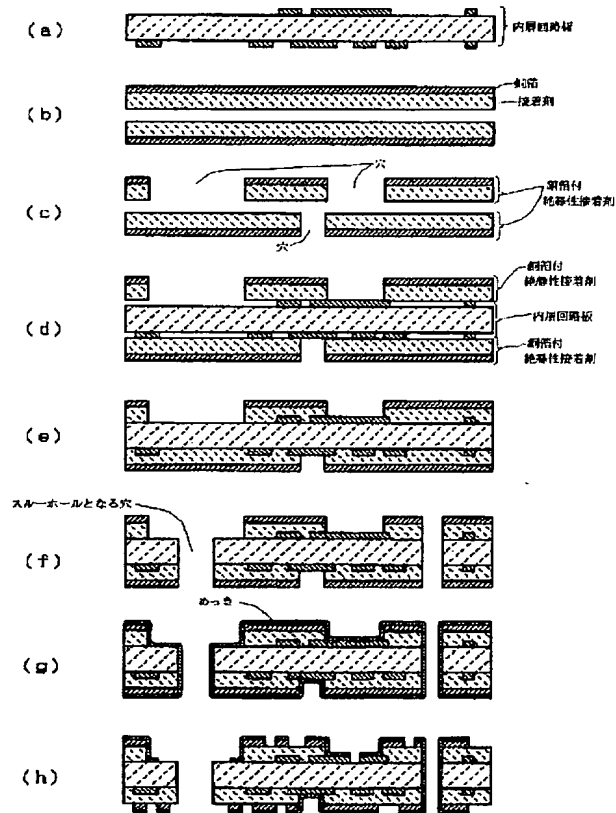
【図1】



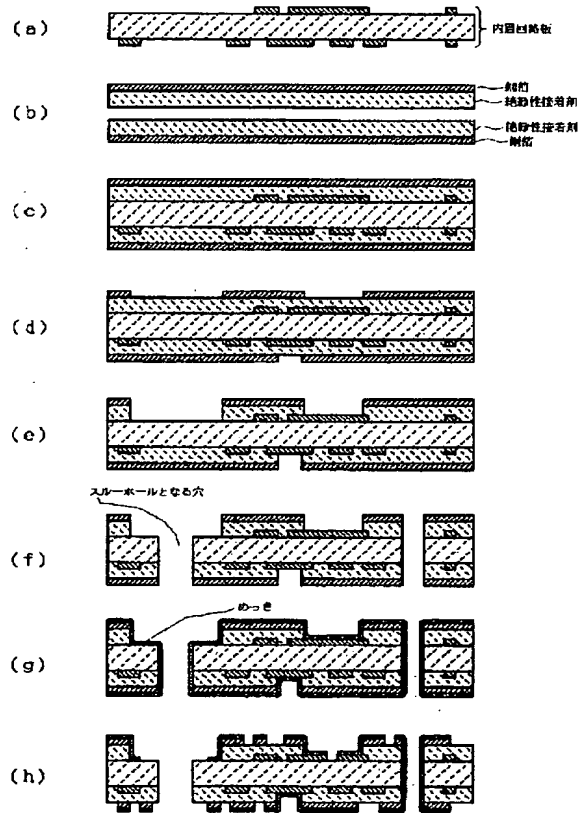
【図2】



【図3】



【図4】



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(71)Applicant : HITACHI CHEM CO LTD

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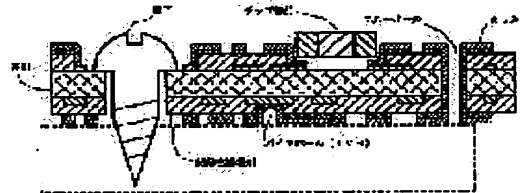
(72)Inventor : TAZAWA KAZUYUKI
OGINO HARUO
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(54) WIRING BOARD AND MANUFACTURE THEREOF

(57)Abstract:

PROBLEM TO BE SOLVED: To make it possible to simply and efficiently manufacture a wiring board excellent in low profile by forming recesses in chip components on a multilayer wiring board having via holes or in places of installation of board securing screws.

SOLUTION: Insulating adhesive is applied to the copper foil to form insulating adhesive layers with the copper foil. The adhesive surfaces of such insulating adhesive layers with copper foil are superposed in such a manner that they are in contact with inner circuits, and they are laminated and integrated by application of heat and pressure. The insulating adhesive layer of the obtained laminated board is selectively etched and removed to form recesses. Further, the entire surface of the workpiece is subjected to electroless plating, and the unnecessary copper foil is selectively etched and removed to obtain this wiring board. The recesses can be formed by removing the outermost wiring layer and the insulating layer supporting the wiring layer, and the inner circuits exposed in the recesses and the circuit in the outermost layer can be connected with each other by plating.



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[Claim(s)]

[Claim 1] A patchboard characterized by having a crevice into a loading portion of a chip or a screw for substrate immobilization in a multilayer-interconnection board which has the Bahia hall which connects two or more insulating layers, two or more wiring layers, and a wiring layer that adjoins at least.

[Claim 2] A patchboard according to claim 1 with which a crevice is characterized by removing a wiring layer of the outermost layer, and an insulating layer which supports it.

[Claim 3] A patchboard according to claim 1 or 2 with which a inner layer circuit exposed to a crevice and a circuit of the outermost layer are characterized by connecting with plating.

[Claim 4] The manufacturing method of the patchboard carry out piling up and carrying out heating pressurization, carrying out the laminating unification of the adhesive coated surface of an insulation glue line with copper foil which made a hole in a part which forms a crevice of an insulation glue line with copper foil which applied insulating adhesives to copper foil beforehand, and made the hole so that a inner layer circuit side may be contacted, performing nonelectrolytic plating or nonelectrolytic plating, and electrolysis plating, and carrying out etching removal alternatively in copper foil of an unnecessary part all over the laminate which carried out laminating unification as the feature.

[Claim 5] A manufacturing method of a patchboard according to claim 4 with which insulating adhesives are characterized by being a macromolecule epoxy polymer.

[Claim 6] An adhesive coated surface of an insulation glue line with copper foil which applied insulating adhesives to copper foil is piled up so that a inner layer circuit side may be contacted. After carrying out heating pressurization, carrying out laminating unification and carrying out etching removal of the copper foil of a part which forms a crevice of the laminate which carried out laminating unification alternatively, A manufacturing method of a patchboard according to claim 1, 2, or 3 characterized by carrying out etching removal of the insulating glue line which exposed copper foil to a part which carried out etching removal alternatively, performing nonelectrolytic plating on the whole surface further, and carrying out etching removal of the copper foil of an unnecessary part alternatively.

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to a patchboard and its manufacturing method.

[0002]

[Description of the Prior Art] The densification of a multilayer-interconnection board and thin shape-ization progress and the multilayer-interconnection board manufacturing method which

does not use glass fabrics is examined in recent years. the so-called interstitial BAIA hole (it is hereafter called IVH --) where only the adjoining wiring layer connects That is [the method of forming is examined variously], by not using glass fabrics, the thickness of an insulating layer is controlled and the wiring area of circuitry layers other than a connection layer increases it by connection of only the adjoining wiring layer. As the patchboard which has such a Bahia hall is indicated by JP,58-64097,A and JP,4-148590,A and is shown in drawing 2 , the multilayer-interconnection board which has the Bahia hall which connects two or more insulating layers, two or more wiring layers, and the wiring layer that adjoins at least is indicated.

[0003] Moreover, chemical etching of an insulating resin layer and the insulating resin layer which carried out etching removal of the part which forms a metal layer further and forms the Bahia hall of the metal layer alternatively on it, and was exposed to the removed part is carried out on a inner layer circuit, a hole wall is metalized, and the method of forming the Bahia hall is indicated by JP,4-148590,A, JP,5-259649,A, etc. Among these, using alkali solubility resin for insulating resin, and using alkali for JP,5-259649,A as a chemical etching reagent is indicated, and it is the photosensitive Ciba-Geigy epoxy resin [resin / insulating] in JP,4-148590,A. Using the Ciba-Geigy developer DY90 (mixture of propylene carbonate, a cyclohexanone, and gamma butyl lactone) as a chemical etching reagent is indicated using Probimer 52.

[0004]

[Problem(s) to be Solved by the Invention] It is impossible by the way, to correspond with the multilayer-interconnection board which has the Bahia hall which thin shape-ization is further called for like electronic equipment especially a video camera, or a notebook computer, and is indicated by conventional JP,58-64097,A recently.

[0005] This invention aims at offering the method of manufacturing the patchboard excellent in thin shape-ization, and such a patchboard simple more efficiently.

[0006]

[Means for Solving the Problem] A patchboard of this invention is characterized by having a crevice into a loading portion of a chip or a screw for substrate immobilization in a multilayer-interconnection board which has the Bahia hall which connects two or more insulating layers, two or more wiring layers, and a wiring layer that adjoins at least.

[0007] Heating pressurization can be piled up and carried out, such a patchboard can carry out the laminating unification of the adhesive coated surface of an insulation glue line with copper foil which made a hole in a part which forms a crevice of an insulation glue line with copper foil which applied insulating adhesives to copper foil beforehand, and made the hole so that a inner layer circuit side may be contacted, nonelectrolytic plating can be performed all over the laminate which carried out laminating unification, and copper foil of an unnecessary part can be

manufactured by carrying out etching removal alternatively.

[0008]

[Embodiment of the Invention] Moreover, heating pressurization can be piled up and carried out, laminating unification can be carried out, etching removal of the insulating glue line of the part which forms the crevice of the laminate which carried out laminating unification can be carried out alternatively, nonelectrolytic plating can be further performed on the whole surface, and it can manufacture also by carrying out etching removal of the copper foil of an unnecessary part alternatively so that a inner layer circuit side may be contacted in the adhesive coated surface of the insulation glue line with copper foil which applied insulating adhesives to copper foil.

[0009] As shown in drawing 1 , the crevice of this invention can remove and form the wiring layer of the outermost layer, and the insulating layer which supports it, and the inner layer circuit exposed to this crevice and the circuit of the outermost layer can connect it with plating.

[0010] The insulation glue line with copper foil which applied insulating adhesives to the copper foil used for this invention can use the three-layer copper foil which sandwiched the electrolytic copper foil generally used, rolling copper foil, ultra-thin copper foil, and nickel in the center for copper foil with a printed wired board or a multilayer-interconnection board. The thermosetting epoxy adhesive film which makes a constituent the with a molecular weight of 100,000 or more amount epoxy polymer of halogenation macromolecules and cross linking agent which have the film organization potency to which it is referred to as epoxy group / phenolated water acid radical =1:0.9-1.1, and the combination equivalent ratio of a 2 organic-functions epoxy resin and halogenation 2 organic-functions phenols was heated under existence of a catalyst, and carried out the polymerization, and a polyfunctional epoxy resin can be used for these insulating adhesives. Moreover, the thermosetting epoxy adhesion resin insulating layer which changed to the halogenation macromolecule epoxy polymer and used bromine-ized phenoxy resin is also usable.

[0011] In order to make a hole in the part which forms a crevice beforehand, in a large area or the complicated configuration section, punching by the tooth form is the optimal. If circular, punching by the drill is also applicable. If removal of the circuit specification or carbide with which the insulating fall by carbonization does not become a problem is possible in an after process, laser beam machining is also possible.

[0012] Although the cushion pressing method is not indispensable in order to pile up and carry out heating pressurization and to carry out laminating unification so that a inner layer circuit side may be contacted in the adhesive coated surface of the insulation glue line with copper foil which made the hole, it is the optimal at the point of controlling fluid of the resin of an insulating adhesives layer mostly. In the case of the crevice design specification whose resin fluid of an insulating adhesives layer is the property which can be disregarded on parenchyma

and which can be case [a design specification] or disregarded, the end plate pressing method is also possible. As a cushioning material, the combination of heat-resistant mold releasing films, such as TEDORA (the Du Pont make, trade name) and a TPX film (the Mitsui Petrochemical Industries, Ltd. make, trade name), and thermoplastic films, such as polyethylene and polypropylene, is usable. Moreover, water-soluble thermoplasticity films, such as the Novon (Chisso Corp. make, trade name) film, can also be used.

[0013] In order to perform nonelectrolytic plating all over the laminate which carried out laminating unification, the thickness attachment nonelectrolytic plating of CC-41 grade can be used. Moreover, when using nonelectrolytic plating and electrolysis plating together, thickness attachment radio solution copper plating, such as substrate radio solution copper plating, such as CUST-201 (the Hitachi Chemical Co., Ltd. make, trade name), or nonelectrolytic plating liquid CC-41 (the Hitachi Chemical Co., Ltd. make, trade name), can be used. As electrolytic copper plating, copper-sulfate plating and pyrophosphoric acid copper plating can be used.

[0014] In order to carry out etching removal of the copper foil of an unnecessary part alternatively, it is the general technology of a printed wired board. Etching removal of the copper foil by the exposure, development, and etching by the dry film can be performed. an etching reagent -- both a ferric chloride a cupric chloride and alkali -- although -- it is usable, and it is alike, respectively and the suitable dry film is usable. Moreover, cutting removal of the copper foil by NC router is also possible.

[0015] Moreover, in order to pile up and carry out heating pressurization, to carry out laminating unification and to carry out etching removal of the insulating glue line of the part which forms the crevice of the laminate which carried out laminating unification alternatively so that a inner layer circuit side may be contacted in the adhesive coated surface of the insulation glue line with copper foil which applied insulating adhesives to copper foil, the selective etching nature of the resin of the inner layer circuit board and the resin of an insulating adhesives layer is required, and concentrated sulfuric acid is fearless. When the insulating adhesives which blended the above-mentioned macromolecule epoxy polymer are used, by being immersed in the etching reagent which consists of an amide system solvent, an alkali metal compound, and an alcoholic system solvent, selective etching nature is obtained in an epoxy group board, a polyimide substrate system substrate, and BT substrate, and etching of an insulating resin layer can be performed.

[0016]

[Example]

As shown in example 1 drawing 3 (a), etching resist was formed in both sides of the copper-clad laminate E-67 (the Hitachi Chemical Co., Ltd. make, trade name), the chemical etching liquid which makes a ferric chloride/hydrochloric acid a subject for the copper foil exposed from

etching resist was sprayed, etching removal was carried out alternatively, and the inner layer circuit board was created. AS-3000 [next,] (the Hitachi Chemical Co., Ltd. make --) which is the insulating adhesives which blended the macromolecule epoxy polymer with copper foil with a thickness of 18 micrometers characteristic as shown in drawing 3 (b) As it applies with an applicator, it dries the condition for 130 degrees C and 10 minutes and the varnish of a trade name is shown in drawing 3 (c) As a hole is made in the part which forms the crevice of the insulation glue line with copper foil made into the semi-hardening condition by the numerical-control type drill machine and it is shown in drawing 3 (d) As the adhesive coated surface of the insulation glue line with copper foil which made the hole is piled up so that the inner layer circuit side of said inner layer circuit board may be contacted, and it is shown in drawing 3 (e), on condition that pressure 2.5MPa for [retention temperature / of 175 degrees C /, and holding-time] 45 minutes As heating pressurization is carried out, laminating unification is carried out, and it is shown in drawing 3 (f), and the hole used as a through hole is made in the required part of the laminate which carried out laminating unification and it is shown in drawing 3 (g) The laminate which made the hole in CC-41 plating liquid (the Hitachi Chemical Co., Ltd. make, trade name) on 70 degrees C and the conditions of 18 hours As it was immersed, nonelectrolytic plating was performed and it was shown in drawing 3 (h), etching resist was formed in the surface, etching removal of the copper foil of the unnecessary part exposed from etching resist was carried out alternatively, and the patchboard was manufactured. As the crevice of this patchboard was shown in drawing 3 (h), the depth was a thing with 0.05mm, a width of face [of 0.5mm], and a length of 1.0mm. Moreover, the part which carries out a bis-stop is the range of 1.5mm diameter, and became the crevice whose depth is 0.10mm.

[0017] Like example 2 example 1, as shown in drawing 4 (a), the inner layer circuit board was created. Next, as shown in drawing 4 (b), AS-3000 (the Hitachi Chemical Co., Ltd. make, trade name) film which is insulating adhesives was pressed in copper foil with a thickness of 18 micrometers the condition for 130 degrees C, 2MPa, and 5 minutes, and the insulation glue line with copper foil was obtained. As shown in drawing 4 (c), the adhesive coated surface of this insulation glue line with copper foil is piled up so that the inner layer circuit side of said inner layer circuit board may be contacted. Next, on condition that pressure 2.5MPa for 175 degrees C and 45 minutes Heating pressurization is carried out and laminating unification is carried out. In the required part of the laminate which carried out laminating unification The hole which serves as a through hole by the numerical-control type drill machine was made, it was immersed in the chemical etching reagent of the following presentations of the insulating glue line of the part which forms the crevice of a laminate further for 30 minutes at 60 degrees C, and etching removal was carried out alternatively.

(Presentation of a chemical etching reagent)

- A N-methyl-2-pyrrolidone 81 % of the weight - potassium hydroxide
 2.7 % of the weight - methyl alcohol 6.3 % of the weight - water
 Further 10% of the weight in the solution of sodium-hydroxide 40 g/l and potassium
 permanganate 60 g/l CC[after being immersed for 10 minutes at 60 degrees C and performing
 smear processing]-41 plating liquid (the Hitachi Chemical Co., Ltd. make --) It is immersed in
 a trade name at 70 degrees C for 18 hours, and nonelectrolytic plating is performed on the
 whole surface. The lamination by the vacuum roll laminator is followed and it is a vacuum
 cushioning material press (130 degrees C). Etching resist was formed by for 10 minutes, the
 resist image was formed by exposure and development, etching removal of the copper foil of
 the unnecessary part exposed from etching resist was carried out alternatively, and the
 patchboard was created. As the crevice of this patchboard was shown in drawing 4 (h), the depth
 was a thing with 0.05mm, a width of face [of 0.5mm], and a length of 1.0mm. Moreover, the
 part which carries out a bis-stop is the range of 1.5mm diameter, and became the crevice whose
 depth is 0.10mm.

[0018]

[Effect of the Invention] As explained above, the manufacturing method of the patchboard
 excellent in thin shape-ization and the patchboard which was excellent in effectiveness simple
 in such a patchboard can be offered by this invention.

[Brief Description of the Drawings]

[Drawing 1] It is the cross section showing one example of this invention.

[Drawing 2] It is the cross section showing one example of the conventional patchboard with
 the Bahia hall.

[Drawing 3] (a) - (h) is a cross section in each production process for explaining one example of
 this invention, respectively.

[Drawing 4] (a) - (h) is a cross section in each production process for explaining other examples
 of this invention, respectively.

